

ENVIRONMENTAL ASSESSMENT

Case File No. : AA-081686

AK-040-EA01-017

Applicant: Bureau of Land Management
Anchorage Field Office

**Type of
Action:** Implementation of the Red Devil Mine Solid Waste Management Plan

Location: Near Red Devil, Alaska, T. 19 N., R. 44 W., SE¼, Section 6, Seward Meridian.

**Prepared
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Date: May 31, 2001

I. INTRODUCTION

The Red Devil Mine is located approximately 250 miles west of Anchorage, Alaska, eight miles northwest of Sleetmute, and two miles southeast of the community of Red Devil. The site is bisected by Red Devil Creek, which flows about 0.3 miles north to reach the Kuskokwim River.

The Red Devil mercury mine operated sporadically from 1933 until 1971. During its operational life approximately 35,000 flasks of mercury were produced. A flask of mercury weighs 76 pounds (~ two quarts). The site covers about ten acres and consists of surface mining areas, backfilled adits and incline shafts, tailing piles, settling ponds, five large fuel tanks, drum storage areas; the remains of approximately 17 buildings used for housing, laboratory, mill, steam plant, and chemical storage.

Site Investigations were completed in 1989 and 1999. Site sampling in 1999 was completed due to a request from the U.S. Environmental Protection Agency (EPA) to allow them to reevaluate the site according to their Hazards Ranking System. Upon review of the Site Investigation, EPA recognized the high probability that the site would rank high enough to be placed on the National Priorities List (NPL). In response, EPA chose to allow BLM to complete investigations and removal actions under BLM's CERCLA authority to reduce site risks. In 1999, BLM (with its contractors) removed hazardous materials from the site. These materials included: mercury contaminated slag, copper sulfate, sodium hydroxide, potassium carbonate, sodium dichromium dihydrate, 55-gallon drums (contents included used oil, fuel, solvent, grease), and lead-acid batteries. Site soil, water, and sediment were sampled and analyzed according to EPA and Alaska Department of Environmental Conservation (ADEC) guidance.

CY 2000 soil samples showed mercury up to 73,300 mg/kg, arsenic to 10,700 mg/kg, antimony to 13,500 mg/kg, diesel range organic hydrocarbons (DRO) to 22,900 mg/kg, and benzene to 0.095 mg/kg. Groundwater results indicated mercury up to 28.6 ug/L and arsenic to 129 ug/L. Results from 1999 samples indicated the sediments in Red Devil Creek in 1999 were as high as 399 mg/kg mercury, 2,030 mg/kg antimony, and 963 mg/kg arsenic. 1999 soil samples showed lead up to 13,500 mg/kg. For more details on past work and investigations see case file number AA-081686.

The following tasks were completed in 2000 for this project: an Engineering Evaluation/Cost Analysis (EE/CA), to analyze response options for known mercury contamination around the retort building and to analyze additional sampling requirements; additional site characterization: field screened with an X-ray Fluorescence Spectrometer (XRF); sampled and laboratory analyzed samples across the site for metals (mercury, arsenic, antimony, lead) and hydrocarbons. BLM inspected and cleaned the fuel system (pipes and tanks); demolished the contaminated retort building; removed and disposed of waste/contaminant sources. The wastes included: 53,000 pounds of mercury contaminated slag and debris, which contained visible free mercury; 3,000 pounds of

asbestos and used oil/fuel. BLM completed an asbestos and lead survey of all buildings (required to demolish buildings), a site topographic survey, and geotechnical borings needed to design a landfill.

A streamlined risk assessment is currently being completed to analyze and quantify current site risks and risks remaining after implementation of this Proposed Action. A site conceptual solid waste management plan is being completed to document each waste stream and its proposed disposal method.

A. Purpose and Need for the Proposed Action:

The purpose of this Proposed Action is to reduce the risk or hazards that this site poses to human health and the environment. The Proposed Action will help protect the local human, plant, and animal populations, and the Kuskokwim watershed from adverse health effects associated with heavy metals at this site.

B. Conformance With Land Use Plan:

The lands are within the boundary of the Alaska Southwest Planning Area Management Framework Plan (MFP), dated November 1984. The Proposed Action is covered under the Watershed (W-1.1) Activity Objective of the MFP which states that BLM is to “maintain water quality in accordance with the Alaska Water Quality Standards”.

C. Relationship to Statutes, Regulations, Policies, Plans, or Other Environmental Analyses:

The Proposed Action is necessary to comply with Federal and State laws regarding the reporting and cleanup of hazardous material releases. Specific laws and requirements include the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), the Clean Water Act, State of Alaska regulations, and site specific guidance from EPA and the ADEC.

II. PROPOSED ACTION AND ALTERNATIVES

A. Proposed Action:

The Red Devil Mine is near the community of Red Devil, Alaska, at T. 19 N., R. 44 W., SE¼, Section 6, Seward Meridian (see attached map). The Proposed Action is to implement the site conceptual solid waste management plan. Most plan tasks are scheduled to occur in 2001. BLM has tasked its Hazardous Materials contractor to develop a detailed formal work plan for the tasks to be completed in 2001. The work plan will be sent to ADEC, EPA, Native Corporations, and be made available to the public for comments. BLM will request plan concurrence from the Alaska Department of Natural Resources (ADNR) for this action according to section 906(k) of the Alaska National Interest Lands Conservation Act (ANILCA). The work plan will be implemented by a

hazardous material contractor during the 2001 summer field season. Stream crossing will be coordinated with the Alaska Department of Fish and Game (ADF&G), and the U.S. Army Corps. of Engineers, as appropriate.

The site will be accessed by flying personnel and equipment by charter aircraft to the Red Devil airstrip. All Terrain Vehicles (ATVs) and/or a pickup truck may be used to drive from the airstrip or local lodge to the site. Personnel may hire a small boat and operator to access the site from the lodge.

BLM's contractual Statement of Work requests the following actions for 2001:

- 1. Fill data gaps.** Develop a sampling and analysis plan for the items below. The plan may be part of the work plan or a separate document.
 - a. Identify sources of leachable lead in the Mess Hall/Bunkhouse; Houses #1, 3, 4, and warehouse. Review existing Toxicity Characteristic Leaching Procedure (TCLP) results; retest discrete samples to find source. Field screening may be used to narrow sources. A portable XRF may provide sufficient information according to EPA. TCLP lead lab analyses may not be necessary. Scope for ≤ 25 lab samples.
 - b. Analyze retort furnace slag for total mercury, TCLP arsenic and mercury. Scope for ≤ 6 analyses (2 total Hg, 2 TCLP Hg, 2 TCLP As).
 - c. Analyze retort building pad surface soils for total mercury and total arsenic, southwest and northeast of the CY 2000 sample locations, to determine the lateral extent of contamination. Scope for ≤ 20 analyses: 10 total Hg, 10 total As.
 - d. Visually inspect for elemental mercury beneath the retort building concrete foundation. This may be accomplished by using a hand operated coring drill or concrete saw. Use a minimum of three sampling locations.
 - e. Collect six soil samples across the site and have them analyzed for metals bioavailability. Analyze each sample for arsenic and mercury; speciate mercury results for cinnabar and elemental mercury. Analysis is available from the University of Colorado, John Drexler, at an estimated cost of \$200/sample. Sample locations include: retort area (2), settling pond, general mine area, housing area, Red Devil Creek sediments.

2. Design and develop a Work Plan to:

- a. Install an impermeable cap over the contaminated tailings/soils on the retort building pad. The cap must include an impermeable landfill grade liner. Up gradient surface drainage will be engineered to flow around the cap, not over it. Estimated cap area is 30,000 sq. ft. (100 ft. x 300 ft.).
- b. Construct a monofill to bury the retort building debris in the retort building area. Follow general requirements in Alaska's 18 AAC 60 regulation. A State permit is not required.
 - i. The construction debris monofill may be constructed over or adjacent to the retort building foundation and contaminated soils. Construction of the monofill over the contaminated soils may simplify the design and construction requirements and reduce costs, by combining the cap and monofill.
 - ii. The monofill will contain at least two cells, one for non-hazardous debris (solid waste/building debris), and one for the retort building debris. It has been proposed in the Red Devil Solid Waste Plan to construct two separate monofills, one in the retort building area, and the other in the general mine area (across the creek from the retort). This is acceptable.
 - iii. The retort building debris cell (hot cell) will be fully lined and sealed with at least a High Density Polyethylene (HDPE) 60 mil liner or equivalent. Debris will be pressure washed (if it was not previously washed) and crushed (run over with trackhoe), and placed in a cell. Void space will be filled with tailings or similar fill material. In addition, EPA recommended a 3% cement mixture to further stabilize the hot cell to achieve 90% contaminant mobility reduction. The contractor may recommend a better alternative to physically and chemically stabilize this cell. A treatability study has been done using MT² proprietary chemical stabilizer. The chemical stabilizer may be mixed with the cement to further reduce contaminant mobility.

- iv. One retort building TCLP sample failed for mercury, so suspect hazardous debris must be treated to achieve 90% reduction in contaminant mobility. MT² chemical stabilizer can be sprayed on suspect debris components to immobilize metals. Land Disposal Regulation (LDR) treatment standards may be used. No additional sampling will be done.
 - v. BLM desires to leave the retort building concrete foundation in place, and construct the cap/monofill over it. The hot cell will likely be constructed on the part of the slab that formerly supported the retort chamber, cooling tubes, and decanting vats. Suspect contaminated concrete may be treated with a sprayed application of MT² chemical stabilizer. If inspection beneath the slab (item 1.d.) identifies significant elemental mercury under the slab, the stabilization or disposal of this material is beyond the scope of this task order, and will be addressed under a modification if necessary.
 - vi. The refractory bricks will go into the hot cell. The bricks that came out of the retort chamber will be treated by surface spraying the bricks with MT² chemical stabilizer and/or a mixture of MT² stabilizer and cement.
 - vii. Depending on the slag pile test results, the slag will go into the hot cell or be disposed of off site.
 - viii. Any recoverable elemental mercury will be recycled/disposed off site.
- c. Demolish remaining site buildings and dispose of the debris in an on-site monofill. Eleven buildings were identified to contain non-friable asbestos as part of the structure. Five buildings had lead samples that failed for TCLP lead. Leachable lead components can be treated with a MT² stabilizer. Refer to the March 2001 Red Devil Mine report for the results of the Asbestos and Lead survey. A separate asbestos removal may not be necessary for some or all buildings; they may be demolished as-is, and buried on site in a monofill. Special procedures to eliminate the release of asbestos must be used to avoid the aerial release of asbestos fibers. Otherwise, asbestos may be removed prior to demolition and buried on site or transported to the Anchorage Landfill for disposal. Segregated wood debris from building demolitions may be burned on site.

- d. All wastes removed from the site will be packaged in bulk containers (such as 1 cubic yard EP2 boxes) to take advantage of bulk waste disposal pricing. Variations may be authorized by BLM as necessary.
- e. Dispose of approximately 35 transformer casings (carcasses) in an on-site monofill. All are drained of oil. Transformers that tested >50 ppm PCBs were disposed of off-site. If past data is not conclusive, additional field screening may be necessary. If data indicates a transformer contained PCBs >50 ppm, proper cleaning will be required.
- f. Re-grade embankment slopes during the construction of monofills to as close to 3:1 (horizontal:vertical) as possible. Install silt screen when excavating tailings near Red Devil Creek. A culvert washout left 30 foot high walls next to the creek. The material can be used as fill for the cap and monofill(s).
- g. Survey to insure drainage gradients and for as-built drawings.

3. Perform/Implement Sampling and Work Plan Tasks described in items 1 and 2 above.

All plans and actions should comply with Federal and State regulations. Coordinate design, plans, and report specifics with BLM.

BLM plans to implement this interim cleanup measure under its authority under CERCLA. The development of this plan to dispose of the retort building debris in a monofill has been coordinated with EPA managers and Department of Interior Solicitors to comply with EPA's Area of Contamination (AOC) policy. Although no Federal or State permits are required to construct landfills on this CERCLA site, draft and final design plans will be developed to comply with all applicable Federal and State regulations. These plans will be sent to EPA, ADEC, applicable Native corporations, and the public for comments. Qualified local labor will be utilized if available.

Due to a bridge washout on the Red Devil Creek, the eastern portion of the site will be accessed by driving through the Creek via a previously installed crossing. This crossing entails driving through the Creek for about 60 feet, and was approved by ADF&G during the 1999 and 2000 field work. If ADF&G requires a more direct crossing, BLM contractors may have to bulldoze tailing piles to gain access. Although the Creek is not classified by ADF&G as anadromous, special consideration and efforts will be made to minimize disturbance of the creek bed and water.

All work areas in this project are on former mine operation areas which have previously disturbed soils and vegetation. Environmental consultants (contractors) will be hired by BLM to plan and implement the removal and sampling operations at the site according to all Federal and State environmental and safety regulations. Environmental impacts will be reassessed if future work exceeds the scope of this environmental assessment. Additional information regarding this site and plan specifications are available in case file AA-081686.

B. No Action Alternative:

Under the No Action Alternative, BLM will continue to implement current management practices until another Proposed Action is designed.

III. AFFECTED ENVIRONMENT

The Red Devil Mine is located approximately two miles southeast of the community of Red Devil, approximately 0.3 miles south of the Kuskokwim River. The site covers about ten acres. (See the attached map for location. Additional maps are available in case file AA-081686.)

A. Critical Elements:

The following critical elements of the environment are either not present or would not be affected by the Proposed Action:

Areas of Critical Environmental Concern
Environmental Justice
Farm Lands, Prime or Unique
Flood plains
Invasive, Non-native Species
Native American Religious Concerns
Wild and Scenic Rivers
Wilderness

1. Air Quality:

Ambient air quality at the site was tested with a mercury vapor monitor and photo ionization detector during site investigations in 1988, 1999, and 2000. Results indicated mercury and Volatile Organic Compounds were within permissible exposure levels. Surface soil mercury concentrations exceed EPA and ADEC standards for inhalation hazards for long-term exposures.

2. Cultural Resources:

Aboriginal inhabitants of this area were the Kuskokwim River Ingalik (Van Stone and Goddard, 1981). Traditionally, habitation sites were located along rivers or major streams. While areas such as the Red Devil Mine may have been used by the aboriginal inhabitants in the past, there is little potential for any archaeological remains to have survived the mining activity conducted here in the twentieth century. Mercury was discovered at this site in 1933. Mining began in 1939 and continued under several operators until 1972 with a short hiatus during World War II (Oswalt, 1980). In spite of the relatively recent activity at this mine, none of the structures remain intact. Structures have succumbed to the ravages of weather and human scavenging for building materials. None of the structures appear to have retained sufficient integrity to be eligible to the National Register of Historic Places. Therefore, no further consultation is necessary under Section 106 of the National Historic Preservation Act. A report of examination for cultural resources, dated May 8, 2001, is located in case file AA-081686.

3. Subsistence:

A Section 810 ANILCA Compliance/Determination of Need, dated May 8, 2001, is located in case file AA-081686.

4. Threatened and Endangered Species:

The threatened and endangered species clearance dated May 9, 2001, is located in case file AA-081686.

5. Wastes, Hazardous or Solid:

Most of the building debris that will be disposed of is classified as solid waste. Some of the debris tested as characteristic hazardous waste (failed the TCLP), but is not regulated as a RCRA hazardous waste because the wastes are being addressed on-site under the CERCLA AOC concept. Asbestos in the buildings is non-friable, but could become friable during the demolition process. Tailings and soils contain mercury, arsenic, antimony, and lead. Some of the soils/tailings also tested as characteristic hazardous waste. Some transformers on site may contain residual PCB oil. Benzene in soils associated with fuel releases may be hazardous. EPA and ADEC guidance will be used in the handling and disposal of these wastes and materials.

6. Water Quality, Surface and Ground:

Surface and ground water at the site are not used for drinking water purposes. Surface water samples on site and up and down stream have shown elevated levels of metals. The local geology that made the area a viable mining district also causes detectible quantities of metals to be present in surface waters. Water sampled in the Red Devil Creek and in on-site monitoring wells exceeded EPA drinking water standards for mercury and arsenic. Water sampled in the Kuskokwim River near the site met EPA drinking water standards for metals analyzed. Surface waters of this region support the local fishing industry and subsistence use. Water quality data are located in case file AA-081686.

7. Wetlands/Riparian Zones:

The Red Devil Creek flows through the site and to the Kuskokwim River. The banks of these water bodies are riparian zones and may be considered wetlands. However, the portion of Red Devil Creek that flows through the site has been altered due to former mining activities. The creek channel is through tailings piles and is littered with empty 55-gallon drums, wooden timbers, and pipe. The creek's discharge varies seasonally, but was measured at 1.16 ft³/sec (BLM, unpublished data, 1999). Observations in July 1998 and 1999 showed the creek's water filled a channel about four to six feet wide and up to six inches deep. The Red Devil Creek is not listed as an anadromous stream by the ADF&G, therefore it may not fall under Alaska Title 16 requirements for a permit from ADF&G. No marshes or similar wetlands have been observed. The topography is steep and well drained. A site specific wetlands survey has not been done for the site.

B. Wildlife:

Moderate to low densities of moose occur in the areas associated with willow shrubs and mixed forest. Predators such as wolves, black and brown bear, lynx and marten may frequent the area, but are highly mobile and would be encountered for short periods of time. Resident and migrant land birds nest and feed in shrub (alder and

willow) and adjacent forest habitats. One species of bat occurs in the region. Bluffs along the Kuskokwim River near the mine site provide nesting habitat for raptors including rough-legged hawk, bald eagle and peregrine falcon. Raptor surveys were completed on the Kuskokwim River in July 2000. An active peregrine falcon nest was found seven miles down river of the Red Devil Mine, on rock cliffs on the north side of the river (Sleetmute D4). There have been no other wildlife surveys completed in this area. The peregrine falcon has been delisted from endangered status in 1999 under the Endangered Species Act. There are no other known threatened or endangered wildlife species in the area.

C. Land Status:

The lands are encumbered by Village Selection F-14936-A (excluded mining claims) and F-14936-A2 (selected all unpatented lands not selected by F-14936-A), (Kuskokwim Corporation), Regional Selection AA-70149, (Calista Corporation) and State Selection AA-74575. There are no easement concerns.

IV. ENVIRONMENTAL CONSEQUENCES

A. Impacts of the Proposed Action:

1. Critical Elements:

a. Subsistence Uses Under Section 810 of ANILCA:

At this time, the Proposed Action will not significantly restrict subsistence uses, decrease the abundance of subsistence resources, alter the distribution of subsistence resources, or limit subsistence user access from currently existing conditions on Federal public lands in Alaska.

b. Threatened and Endangered Species:

The impact of the Proposed Action on threatened and endangered species has been evaluated in accordance with the Threatened and Endangered Species Act. Based on the evaluation, the Proposed Action would not affect threatened and endangered plants, animals, or their habitat.

2. Wildlife:

The impacts of clearing alder shrubs from the over grown road bed and clearing shrubs for access to the site and construction of landfill sites will cause some loss of shrub habitat. It may also cause a disturbance of moose and land birds which use those habitats. The noise associated with the excavating equipment will temporarily displace wildlife from nearby, unaffected shrub and forest areas. Displaced animals may be more vulnerable to predators and may cause breeding birds to abandon nests and breeding territories, increasing mortality. However, the removal of the hazardous materials from the site is a positive action and outweighs the

disturbances to wildlife and its habitat in the longer term. All areas to be cleared for access have been previously disturbed by mining activity.

The abandoned buildings associated with the site may be inhabited by little brown bats, the species of bat that has a common distribution in the area. Demolition of the buildings will cause a sudden displacement of bats, and remove established roosting sites.

B. Impacts of the No Action Alternative:

Under the No Action Alternative, current management practices would allow continued exposure of contaminants to humans and ecological species on site. Contaminants would continue to migrate from source areas and potentially affect the watershed.

1. Critical Elements:

The following critical elements of the environment are either not present or would not be affected by the No Action Alternative:

Areas of Critical Environmental Concern

Cultural Resources

Environmental Justice

Farm Lands (Prime or Unique)

Flood plains

Invasive, Nonnative Species

Native American Religious Concerns

Threatened and Endangered Species

Wild and Scenic Rivers

Wilderness

a. Air Quality:

Metals in site soils could enter the air by vaporization or as particulates during disturbance. People trespassing on the site could be exposed to site contaminants by inhalation, ingestion, and dermal contact. Digging, walking, or operating ATVs or other equipment could disturb the soil and cause exposures. Local practices of scavenging building materials may cause non-friable asbestos to become friable and present an inhalation hazard.

b. Subsistence:

Under the No Action Alternative animals that live on the site or regularly visit the site may consume and be exposed to site contaminants. Metals from the site could accumulate in the animals and be passed on to humans who hunt and consume them. Mercury bioaccumulates in fish and in humans through the consumption of fish.

c. Wastes, Hazardous or Solid:

Under the No Action Alternative, hazardous and solid materials/wastes would remain on site in violation of Federal and State regulations. These wastes may impact the site ecology as well as humans in the area.

d. Water Quality, Surface/Ground:

Surface or ground water quality may continue to degrade under the No Action Alternative as erosion and source migration continues. The geology of the region and the associated mining activities both led to the increase of metals in surface waters. Water leaving the site is not used as a drinking water source. In the event individuals used the water from the Kuskokwim River near the site, previous testing has shown that contaminants from this site have not caused the water to exceed EPA Drinking Water Standards in the Kuskokwim River.

e. Wetlands/Riparian Zones:

The No Action Alternative will allow the contaminants to remain in or near the riparian zone. These contaminants may be harmful to the ecological environment.

C. Residual and Cumulative Impacts:

No residual or cumulative impacts are expected by implementation of the Proposed Action. The No Action alternative could have residual and cumulative impacts. Animals that live on the site or regularly visit the site may consume and be exposed to site contaminants. Metals from the site could accumulate in the animals and be passed on to humans who hunt and consume them. Mercury bioaccumulates in fish and in humans through the consumption of fish.

D. Mitigation Measures:

The Proposed Action includes mitigating measures as part of the action. These measures are found in State and Federal regulations which dictate specific procedures to safely handle hazardous materials and work in contaminated environments. Clearing for access to the site and construction of the landfill sites should be kept to the minimum needed to complete the cleanup project. Disturbed areas should be contoured to reduce erosion and promote natural revegetation.

Abandoned buildings should be surveyed for bats prior to demolition. If significant numbers of bats are found using the buildings, bat roosting boxes may be put up in surrounding undisturbed areas to provide alternative bat roosting sites.

V. CONSULTATION AND COORDINATION

A. Persons and Agencies Consulted:

The following people and agencies, along with the general public, have been and will continue to be consulted regarding investigation and cleanup activities at this site:

EPA, Region X, Nick Ceto, Regional Mining Coordinator
ADEC, Contaminated Sites Program, Eileen Olson
BLM Alaska State Office, Wayne Svejnoha, State Hazmat Coordinator
DOI Office of the Solicitor, Lisa Toussaint, Project Attorney
Kuskokwim Corp., Maver Carey
Calista Corp., June McAtee
Alaska Inter-Tribal Council, Debra Vo, Executive Director

B. List of Preparers:

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References

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VanStone, James W. and Ives Goddard, 1981, Territorial groups of West-central Alaska before 1898, in Handbook of North American Indians Volume 6: Subarctic (edited by June Helm), Smithsonian Institution, Washington. pp 556-561.

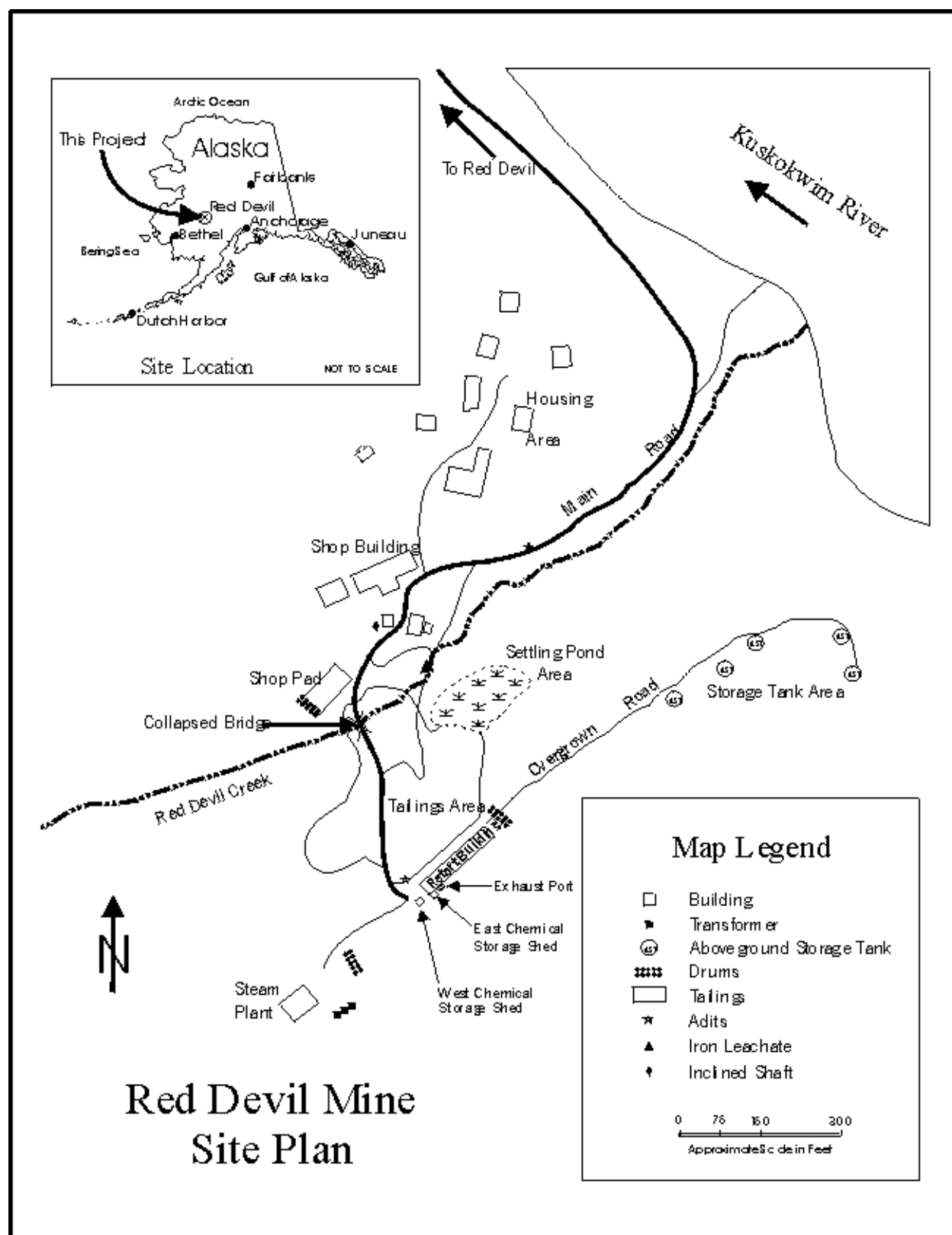


Figure 1.